(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 447 322 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
01.09.2021 Bulletin 2021/35

(21) Application number: **18192204.8**

(22) Date of filing: **15.07.2015**

(51) Int Cl.:
F16D 3/84 *(2006.01)* ***H02K 7/00*** *(2006.01)*
F16D 3/76 *(2006.01)* *F02B 63/04* *(2006.01)*
F02B 67/04 *(2006.01)*

(54) **COUPLING FOR POWER GENERATING SYSTEM**

KUPPLUNG FÜR STROMERZEUGERAGGREGAT

COUPLAGE POUR GROUPE ÉLECTROGÈNE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(43) Date of publication of application:
27.02.2019 Bulletin 2019/09

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
15176912.2 / 3 118 476

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Description

[0001] The present invention relates to a coupling for connecting a generator to a prime mover in a power generation system, and in particular a coupling which can facilitate servicing of parts of the system.

[0002] Power generation systems typically comprise a prime mover which drives an electrical generator in order to produce output electrical power. For example, a power generating set may comprise an engine coupled to a generator (alternator). Typically the crankshaft of the engine is mechanically coupled to the shaft of the generator using a coupling.

[0003] In a power generation system it is necessary for the prime mover and the generator to be precisely aligned, to ensure concentricity of the rotating parts. In a generating set this is usually achieved by mounting the engine and the generator on a bed frame. In addition, an adaptor may be used to connect non-rotating parts of the generator and the engine. The adaptor provides additional stability and helps to prevent relative movement between the engine and the generator.

[0004] Power generation systems may comprise a coupling for connecting rotating components of the generator and the prime mover. The coupling may be a flexible coupling, which may help to dampen vibratory torque in the system and/or act as a fuse in the drive line. Flexible couplings typically comprise an elastomeric component, in order to provide the desired flexibility.

[0005] During the lifetime of the power generation system it may become necessary to service some of the moving parts. For example, in certain generating sets, it may become necessary to service parts such as the coupling between the engine and the generator, and/or the engine or generator bearings.

[0006] Existing power generating systems typically require the generator to be moved to provide access for servicing moving parts. In order to move the generator it must first be disconnected. Following servicing, the generator must be reconnected and the engine and generator re-aligned. As a consequence, the servicing of moving parts can be time consuming, complex and costly. For example, the servicing repair time for the coupling on a typical gas generator set installation may be around 14 to 15 hours.

[0007] EP 2 333 323 A1 discloses a wind power turbine with two rotating electrical machines on opposite sides of a supporting structure. A transmission assembly is used to connect the rotors of the two machines. The transmission assembly comprises a first hollow cylinder connected to one of the rotors by an annular elastic joint, and a second hollow cylinder connected to the other rotor and to the first hollow cylinder.

[0008] DE 44 04 791 C1 discloses a drive system for road vehicles comprising an internal combustion engine and an electrical generator. The generator comprises a generator housing which is connected to the engine housing, and a rotor which is mounted in the generator housing such that it can rotate. An elastically deformable torque transmission disc (flexplate) is provided which is connected to the engine crankshaft and to the rotor.

[0009] US 2,385,369 discloses a shaft coupling for coupling an electrical generator to an internal combustion engine. A driving head is secured to a face of the engine flywheel, and a driven head is provided on the generator shaft in spaced relation with the driving head. A ring of rubber is interposed between the driving head and the driven head.

[0010] DE 102 51 646 B3 discloses a membrane coupling for use in a powertrain between a diesel engine and a generator. The membrane coupling uses a thin flat annular membrane. The outer edge of the annular membrane is bolted to a flange on the rim of the engine flywheel. The inner edge of the annular membrane is bolted to a flange on the generator shaft.

[0011] US 2007/194655 discloses a generator connector for connecting an automotive AC generator to a drive shaft. The connector comprises a first cylinder connected to the shaft of the generator's rotor, a second cylinder fitted on the periphery of the first cylinder, and an annular elastic damper between the two. The second cylinder engages with an inner periphery of a coupler joined to the end of the draft shaft.

[0012] According to one aspect of the present invention there is provided a power generation system as defined in claim 1.

[0013] According to another aspect of the invention there is provided a method of servicing a power generation system as defined in claim 15.

[0014] Preferred features of the invention are recited in the dependent claims.

[0015] The present invention may provide the advantage that the process of servicing moving parts can be simplified, in comparison to previous techniques.

[0016] The elastomeric component may be, for example, rubber or any other appropriate material. In use, the elastomeric component may degrade over time, and may require replacement. This is typically a complex operation requiring removal of the generator and/or engine.

[0017] In accordance with the present invention, the coupling comprises an elastomeric component which is removable radially from the coupling. This may allow the elastomeric component to be removed and replaced by removing a part of an adaptor.

[0018] The elastomeric component is preferably removable without requiring removal of the generator. Preferably one part of the adaptor is removable to leave an opening while the other part of the adaptor remains in place, and the elastomeric component is removable through the opening.

[0019] The coupling comprises a hub and a coupling flange, and the elastomeric component is located between the hub and the coupling flange. For example, the elastomeric component may be disc-shaped, and may be located inside the coupling flange. This may provide a compact coupling arrangement.

[0020] In order to allow the elastomeric component to be removed, the coupling is arranged such that the coupling flange can be moved axially in order to disengage with the elastomeric component. A locking assembly may be provided for holding the coupling together during operation of the power generation system. The locking assembly, when disconnected, may be movable in an axial direction, in order to reveal the hub.

[0021] In one embodiment the coupling comprises two elastomeric components, both of which may be located between the hub and a coupling flange, and both of which may be removable. At least one of the elastomeric components may be located around the hub. One or both of the elastomeric components may be located inside the coupling flange.

[0022] Alternatively, other types of flexible coupling may be used. For example, the elastomeric component may be located adjacent to at least one of the hub and the coupling flange in an axial direction.

[0023] An adaptor is preferably arranged to surround the coupling between the engine and the generator. By providing by providing an adaptor comprising two separable parts, it may be possible for one part to be removed in order to allow the coupling to be serviced. Furthermore, it may be possible to access other parts such as bearings for servicing and/or replacement.

[0024] Preferably one part of the adaptor can be removed while the other part is connected between the generator and prime mover. This may allow access to moving parts to be provided without requiring the generator and/or engine to be moved. This this arrangement may allow the alignment between the generator and the engine to be maintained.

[0025] Preferably each part of the adaptor is connectable between the generator and the prime mover. For example, each part of the adaptor may comprise a first flange for connection to the engine and a second flange for connection to the generator. Thus each part of the adaptor may be structural, which may help to provide rigidity between the engine and the generator.

[0026] Preferably the removal of one part of the adaptor exposes the inside of the adaptor. Thus, in use, the removal of one part of the adaptor may expose parts which are inside or adjacent to the adaptor, such as a coupling or bearing. This may allow servicing of those parts which would otherwise be inaccessible due to the presence of the adaptor.

[0027] Preferably a part of the adaptor which has been removed can be reinstalled, for example, following the servicing of a moving part. In order to facilitate reinstallation, the removable part of the adaptor may comprise at least one fit bolt. The fit bolt may engage, for example, with the generator or the prime mover. This may help to locate the removable part when it is reinstalled.

[0028] Preferably the two separable parts of the adaptor are connectable, for example by means of bolts or clamps. This can help to ensure that the adaptor has the required mechanical stiffness.

[0029] At least one of the two separable parts may comprise a centering pin which engages with the other separable part. This may help to locate a removable part when it is reinstalled.

[0030] Preferably each separable part comprises a flange for interfacing with the other part. This may help to ensure a connection between the two parts with the required mechanical rigidity. The flanges comprise bolt holes for connecting the two parts. Alternatively some other means such as clamps may be used for connecting the two parts.

[0031] The adaptor may be cylindrical in shape, and is preferably in the form of an open cylinder. This can allow rotating components, such as a generator shaft and/or a coupling, to be located inside the adaptor.

[0032] The two parts of the adaptor may be separable along lines which run in an axial direction between one end of the adaptor and the other. Thus, where the adaptor is in the form of an open cylinder, the lines may run between one open end of the cylinder and the other. However other arrangements are also possible, and for example a removable part of the adaptor may extend along only part of the length of the adaptor in an axial direction.

[0033] The lines of separation between the two parts of the adaptor may be straight, or some other shape such as curved, waved, serrated or castellated. In one embodiment, the lines are substantially parallel to an axis of rotation of the electrical machine, and/or parallel to each other.

[0034] If desired, the adaptor may be separable into three or more different parts. In this case, at least one part may be separable from the or each other part, while at least one part remains connected between the prime mover and the generator.

[0035] The adaptor may be produced using any appropriate technique such as casting, machining, or a combination of the two. In a preferred embodiment the adaptor is at least initially cast. The cast adaptor may subsequently be machined to produce the final adaptor.

[0036] The power generation system may further comprise a bed frame on which the prime mover and generator are mounted. Preferably one part of an adaptor can be removed to provide access to serviceable parts without removing the prime mover or the generator from the bed frame.

[0037] The prime mover may be, for example, an internal combustion engine, such as a gas engine, a diesel engine or a petrol engine, or some other type of prime mover such as a wind or wave turbine. The generator may be any type of electrical generator, such as a synchronous generator or a permanent magnet generator.

[0038] The method may further comprise removing the elastomeric component of the coupling through an opening left by a removed part of the adaptor. Preferably the elastomeric component is removed in a radial direction without moving the generator.

[0039] In the present specification terms such as "radial", "axial", "circumferential" etc. are generally defined

with reference to the axis of a generator and/or engine to which the adaptor is to be connected, and/or the longitudinal axis of the adaptor.

[0040] Features of one aspect of the invention may be provided with any other aspect. Apparatus features may be provided with method aspects and vice versa.

[0041] Preferred features of the present invention will now be described, purely by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows an overview of a generating set in an embodiment of the present invention;
Figure 2 shows an adaptor in an embodiment of the present invention;
Figure 3 shows part of the generating set with the adaptor in place;
Figure 4 is an exploded view of a coupling for use in an embodiment of the present invention; and
Figures 5 to 13 illustrate a process for replacement of elastomeric components in the coupling.

Overview

[0042] Figure 1 shows an overview of a generating set in an embodiment of the present invention. Referring to Figure 1, the generating set comprises an engine 10 coupled to a generator (alternator) 12. In this embodiment the engine 10 is a gas engine, although any type of internal combustion engine such as a petrol or diesel engine may be used instead. In this embodiment the generator 12 is a synchronous generator, although any other type of electrical generator may be used instead. The engine 10 and generator 12 are both mounted on a bed frame 14. A coupling 16 is used to connect the engine flywheel to the shaft of the generator. An adaptor 18 surrounds the coupling, and is used to connect the engine to the generator housing. The adaptor 18 helps to prevent relative movement between the engine and the generator, thus ensuring greater stability during operation of the generating set.

[0043] In the embodiment of Figure 1, the coupling 16 is a flexible coupling. Flexible couplings are typically used in high power generating sets. For example, high horse power continuous purpose gas generating sets may require a flexible coupling, in particular where a variety of gases such as low BTU natural gas to pipeline gas are used. The flexible coupling can dampen vibratory torque in the system and acts as fuse in the drive line.

[0044] Flexible couplings typically include an elastomeric material. The elastomeric material may degrade over time, particularly when subject to high stresses. As a consequence, the life time of a flexible coupling varies depending on its application. In some cases the flexible coupling may fail before the end of its target life. In this case servicing of the coupling may be required outside of a scheduled overhaul of the generator set.

[0045] In existing generator set designs, the adaptor is formed from a single piece of cast metal. Windows may be provided in the adaptor, to allow an operator to connect the coupling once the generator and engine have been aligned. However this does not allow replacement or servicing of the coupling.

[0046] In order to service the coupling in existing generator set designs, the generator set is first shut down. All harnesses and other connections are disconnected, and the generator with adaptor is pulled back from the engine. Following replacement or servicing of the coupling, it is necessary for all parts to be reconnected, and the generator to be re-aligned with the engine.

[0047] As a consequence, replacement or servicing of the coupling is a complex and time consuming process, typically taking 14 to 15 hours depending on the installation. This results in high shutdown costs, both in terms of the servicing required and the lost generating capacity.

Adaptor design

[0048] Embodiments of the present invention relate to a new adaptor design and a new flexible coupling which can facilitate servicing without requiring the generator to be moved.

[0049] Figure 2 shows an adaptor 18 in an embodiment of the present invention. Referring to Figure 2, the adaptor 18 is generally cylindrical, and comprises a first flange 22 for connection to the generator and a second flange 24 for connection to the engine. The first flange and second flange each comprise a number of bolt holes. Bolts 26 pass through the bolt holes in the first flange in order to connect the adaptor to the generator, while bolts 28 pass through the bolt holes in the second flange in order to connect the adaptor to the engine. In this embodiment cross braces 23 are provided on the outside surface of the adaptor, to help provide structural rigidity. Windows 25 are provided in the adaptor, to allow an operator to lock the coupling on generator shaft once the engine, generator and adaptor are in place.

[0050] In the arrangement of Figure 2, the adaptor 18 is divided into a top part 30 and a bottom part 32. In this embodiment the division occurs in a plane within which the axis of symmetry of the adaptor lies. Thus, in this embodiment the two halves are semi-cylindrical. However the division may occur in different places and the two parts are not necessarily equal.

[0051] Still referring to Figure 2, flanges 34, 36 are provided at the interfaces between the top part and the bottom part. Each of the flanges has a number of bolt holes 38. Bolts 40 pass through the bolt holes to connect the two parts together. Two additional centering pins 42 are provided on each side of the adaptor. The centering pins 42 help to ensure alignment between the two parts of the adaptor. In addition, centering pins 44 are provided in the second flange 24 in the top part 30. The centering pins 44 help to ensure alignment of the top part 30 with the engine, in particular following removal of the top part in the way described below.

[0052] The adaptor 18 of Figure 2 may be made from

a cast metal, such as spheroidal graphite cast iron. The adaptor may be machined following casting to provide the appropriate interface surfaces and/or bolt holes.

[0053] Figure 3 shows part of the generating set with the adaptor 18 in place. Referring to Figure 3, the two parts 30, 32 of the adaptor 18 are held together by bolts 40. The adaptor is bolted to the engine 10 with bolts 26, and to the generator 12 with bolts 28.

Flexible coupling

[0054] Figure 4 is an exploded view of a coupling for use in an embodiment of the present invention. Referring to Figure 4, the coupling comprises a hub 50, two elastomeric components 52, 54, a coupling flange 56, and a locking assembly 58. The hub 50 is arranged to be connected to the generator shaft, while the coupling flange 56 is arranged to be connected to the engine fly wheel.

[0055] In the arrangement of Figure 4, each of the elastomeric components 52, 54 is disc-shaped. The elastomeric components may be made from any suitable material having the required degree of flexibility, such as rubber. A sleeve 53, 55 is provided on the inside of each of the elastomeric components 52, 54. The sleeves are made from a rigid material such as a metal or a high density plastic. Each of the sleeves 53, 55 includes bolt holes 57, 59 for connecting the elastomeric components 52, 54 to the hub 50.

[0056] The hub 50 includes a hub flange 60 with bolt holes 62. Hub bolts 64 pass through the bolt holes 62 and the bolt holes 57, 59 in the sleeves 53, 55, in order to bolt the hub 50 to the elastomeric components 52, 54. When connected, part of the hub 50 passes through the inside of the second elastomeric component 54, while the end of the hub 50 engages with the sleeve 53 in the first elastomeric component 52.

[0057] The outside circumferences of the elastomeric components include castellations 66. The coupling flange 56 is generally cylindrical, and fits around the elastomeric components 52, 54. The inside surface of the coupling flange includes castellations 68, which engage with the castellations 66 on the outside of the elastomeric components 52, 54.

[0058] The coupling flange 56 includes a flange 70 with bolt holes 72. Flange bolts 74 are used to bolt the coupling flange to the engine fly wheel through the bolt holes 72. The external locking assembly 58 comprises bolts 76 which are used to hold the coupling together.

[0059] The coupling shown in Figure 4 provides a torsionally soft connection between the engine and the generator. A flexible torque transmission characteristic is achieved by means of the elastomeric components 52, 54 between the hub 50 and the coupling flange 56. This can allow the absorption of torsional vibrations and may help to compensate for misalignments.

Servicing

[0060] In use the elastomeric components 52, 54 shown in Figure 4 may degrade and require replacement. Figures 5 to 13 illustrate a process for replacement of the elastomeric components 52, 54 without requiring removal of the generator 12.

[0061] Referring to Figure 5, in step 1 the adaptor bolts 26 connecting the top part of the adaptor 30 to the engine 10, and the adaptor bolts 28 connecting the top part of the adaptor 30 to the generator 12, are undone. In addition, the bolts 40 connecting the two parts of the adaptor together are undone.

[0062] Referring to Figure 6, in step 2 the top part 30 of the adaptor is removed from the generator set in a radial direction. Removal of the top part of the adaptor exposes the coupling 16.

[0063] Referring to Figure 7, in step 3 the bolts 76 of the external locking assembly 58 are undone. The locking assembly 58 is then slid axially along the shaft towards the generator 12. This exposes the hub bolts 64.

[0064] Referring to Figure 8, in step 4 the hub bolts 64 are undone and removed. This disconnects the elastomeric components 52, 54 from the hub 50.

[0065] Referring to Figure 9, in step 5 the coupling flange bolts 74 are undone and removed. This disconnects the coupling flange 56 from the engine 10.

[0066] Referring to Figure 10, in step 6 the coupling flange 56 is slid axially along the shaft towards the generator 12. This reveals the first elastomeric component 52 and part of the second elastomeric component 54. In this position the coupling flange 56 is held in place, for example, with a lifting device (not shown).

[0067] Referring to Figure 11, in step 7 the first elastomeric component 52 is then removed in a radial direction. Removal of the elastomeric component 52 is possible due to the fact that the hub bolts 64 have been removed and the coupling flange 56 has been pulled back.

[0068] Referring to Figure 12, in step 8 the second elastomeric component 54 is then slid axially along the hub 50 in the direction of the engine 10. This releases the elastomeric component 54 from the hub.

[0069] Referring to Figure 13, in step 9 the second elastomeric component 54 is then removed in a radial direction.

[0070] The elastomeric components 52, 54 can then be replaced. Steps 1 to 9 are then repeated in reverse, in order to reassemble the coupling with the new elastomeric components.

[0071] Some of the advantages which may be provided by the techniques described above are as follows:

- No need to move the generator back when servicing the coupling
- Fewer steps for disassembly /assembly
- Servicing time reduced by 80% compared to previous techniques

- Less facility space required
- No need to disassemble other subsystems of the generator set, such as wires from the generator
- Lower cost of ownership to the end user.

[0072] In the above, embodiments of the invention have been described by way of example only, and variations in the design are possible. For example, the division between the two parts of the adaptor may be in different places and the two parts are not necessarily equal. It is not necessary for the adaptor to be divided along the whole of its length, and the removable part may extend along only part of the length of the adaptor. If desired, castellations may be provided on the interfaces between the two parts of the adaptor. Furthermore, if desired, the adaptor may comprise three or more parts, the only requirement being that at least one part of the adaptor is separable from the or each other part. Many other variations in detail will be apparent to the skilled person within the scope of the appended claims.

[0073] Although embodiments of the invention have been described with reference to a generator set, the present invention may be used with any type of power generation system where a coupling is used to connect a prime mover to a generator.

Claims

1. A power generation system comprising:

a prime mover (10),
a generator (12) with a generator shaft; and
a coupling which connects rotating components of the generator (12) and the prime mover (10), wherein the coupling comprises:

a hub (50) connected to the generator shaft;
a coupling flange (56) connected to a rotating component of the prime mover (10); and
an elastomeric component (52, 54) located between the hub (50) and the coupling flange (56) in order to provide flexible torque transmission between the prime mover (10) and the generator (12),

characterised in that:

the coupling flange (56) is arranged to be disconnected from the prime mover and to move axially along the generator shaft towards the generator (12) in order to disengage the coupling flange (56) from the elastomeric component (52, 54); and
the elastomeric component (52, 54) is arranged to be removed radially from the coupling when the coupling flange (56) has been moved axially along the shaft towards the generator.

2. A power generation system according to claim 1, wherein the elastomeric component (52, 54) is located inside the coupling flange (56) during operation of the power generation system.

3. A power generation system according to claim 1 or 2, further comprising a locking assembly (58) for holding the coupling together during operation of the power generation system.

4. A power generation system according to claim 3, wherein the locking assembly (58), when disconnected, is movable in an axial direction to reveal the hub (50).

5. A power generation system according to any of the preceding claims, wherein the elastomeric component (52, 54) is removably connected to the hub (50).

6. A power generation system according to any of the preceding claims, wherein the elastomeric component (52, 54) is disc-shaped.

7. A power generation system according to any of the preceding claims, wherein the elastomeric component (52, 54) is removable radially from the coupling when the coupling flange (56) has been moved axially along the shaft without requiring removal of the generator from the prime mover.

8. A power generation system according to any of the preceding claims, wherein the coupling flange (56) comprises castellations (68) which engage with castellations (66) on the elastomeric component (52, 54).

9. A power generation system according to any of the preceding claims, comprising two elastomeric components (52, 54) both of which are located between the hub (50) and the coupling flange (56).

10. A power generation system according to claim 9, wherein removal of one of the elastomeric components (52) allows the other elastomeric component (54) to be slid axially along the hub (50) and then removed in a radial direction.

11. A power generation system according to any of the preceding claims, further comprising an adaptor (18) for connecting non-rotating parts of the generator and the prime mover, wherein the adaptor is arranged to surround the coupling, and the adaptor comprises two separable parts (30, 32).

12. A power generation system according to claim 11, wherein one part of the adaptor (18) is removable to

leave an opening while the other part of the adaptor remains in place, and the elastomeric component (52, 54) is removable through the opening.

13. A power generation system according to any of the preceding claims, further comprising a bed frame (14), wherein the prime mover and the generator are both mounted on the bed frame.

14. A power generation system according to any of the preceding claims, wherein the elastomeric component (52, 54) is removable in a radial direction without moving the generator.

15. A method of servicing a power generation system comprising a prime mover (10) and a generator (12) with a generator shaft, wherein rotating components of the generator and the prime mover are connected with a coupling, the coupling comprising:

a hub (50) connected to the generator shaft;
a coupling flange (56) connected to a rotating component of the prime mover (10); and
an elastomeric component (52, 54) located between the hub (50) and the coupling flange (56) and which provides flexible torque transmission between the prime mover (10) and the generator (12),
characterised by:

disconnecting the coupling flange (56) from the prime mover;
moving the coupling flange (56) axially along the generator shaft towards the generator (12) in order to disengage the coupling flange (56) from the elastomeric component (52, 54); and
removing the elastomeric component (52, 54) radially from the coupling when the coupling flange (56) has been moved axially along the shaft towards the generator.

Patentansprüche

1. Leistungserzeugungssystem, das Folgendes umfasst:

eine Antriebsmaschine (10),
einen Generator (12) mit einer Generatorwelle; und
eine Kupplung, die drehende Komponenten des Generators (12) und der Antriebsmaschine (10) verbindet,
wobei die Kupplung Folgendes umfasst:

eine mit der Generatorwelle verbundene Nabe (50);
einen Kupplungsflansch (56), der mit einer drehenden Komponente der Antriebsmaschine (10) verbunden ist; und
eine Elastomerkomponente (52, 54), die sich zwischen der Nabe (50) und dem Kupplungsflansch (56) befindet, um eine flexible Drehmomentübertragung zwischen der Antriebsmaschine (10) und dem Generator (12) bereitzustellen,

dadurch gekennzeichnet, dass:

der Kupplungsflansch (56) dazu angeordnet ist, von der Antriebsmaschine abgetrennt zu werden und sich axial entlang der Generatorwelle in Richtung auf den Generator (12) zu bewegen, um den Kupplungsflansch (56) von der Elastomerkomponente (52, 54) zu lösen; und
die Elastomerkomponente (52, 54) dazu angeordnet ist, radial von der Kupplung entfernt zu werden, wenn der Kupplungsflansch (56) axial entlang der Welle in Richtung auf den Generator bewegt worden ist.

2. Leistungserzeugungssystem nach Anspruch 1, wobei sich die Elastomerkomponente (52, 54) während des Betriebs des Leistungserzeugungssystems innerhalb des Kupplungsflanschs (56) befindet.

3. Leistungserzeugungssystem nach Anspruch 1 oder 2, ferner umfassend eine Verriegelungsanordnung (58) zum Zusammenhalten der Kupplung während des Betriebs des Leistungserzeugungssystems.

4. Leistungserzeugungssystem nach Anspruch 3, wobei die Verriegelungsanordnung (58), wenn abgetrennt, in einer Axialrichtung bewegbar ist, um die Nabe (50) freizulegen.

5. Leistungserzeugungssystem nach einem der vorangehenden Ansprüche, wobei die Elastomerkomponente (52, 54) entfernbar mit der Nabe (50) verbunden ist.

6. Leistungserzeugungssystem nach einem der vorangehenden Ansprüche, wobei die Elastomerkomponente (52, 54) scheibenförmig ist.

7. Leistungserzeugungssystem nach einem der vorangehenden Ansprüche, wobei die Elastomerkomponente (52, 54) radial von der Kupplung entfernbar ist, wenn der Kupplungsflansch (56) axial entlang des Schafts bewegt worden ist, ohne das Entfernen des Generators von der Antriebsmaschine zu erfordern.

8. Leistungserzeugungssystem nach einem der voran-

gehenden Ansprüche, wobei der Kupplungsflansch (56) Rechteckzähne (68) umfasst, die in Rechteckzähne (66) an der Elastomerkomponente (52, 54) eingreifen.

9. Leistungserzeugungssystem nach einem der vorangehenden Ansprüche, umfassend zwei Elastomerkomponenten (52, 54), die sich beide zwischen der Nabe (50) und dem Kupplungsflansch (56) befinden.

10. Leistungserzeugungssystem nach Anspruch 9, wobei das Entfernen einer der Elastomerkomponente (52) ermöglicht, dass die andere Elastomerkomponente (54) axial entlang der Nabe (50) verschoben und dann in einer Radialrichtung entfernt wird.

11. Leistungserzeugungssystem nach einem der vorangehenden Ansprüche, ferner umfassend eine Adapter (18) zum Verbinden nicht drehender Teile des Generators und der Antriebsmaschine, wobei der Adapter dazu angeordnet ist, die Kupplung zu umgeben, und der Adapter zwei trennbare Teile (30, 32) umfasst.

12. Leistungserzeugungssystem nach Anspruch 11, wobei ein Teil des Adapters (18) entfernbar ist, um eine Öffnung zurückzulassen, während der andere Teil des Adapters in Position verbleibt, und die Elastomerkomponente (52, 54) durch die Öffnung hindurch entfernbar ist.

13. Leistungserzeugungssystem nach einem der vorangehenden Ansprüche, ferner umfassend einen Bettungsrahmen (14), wobei die Antriebsmaschine und der Generator beide auf dem Bettungsrahmen angebracht sind.

14. Leistungserzeugungssystem nach einem der vorangehenden Ansprüche, wobei die Elastomerkomponente (52, 54) in einer Radialrichtung entfernbar ist, ohne den Generator zu bewegen.

15. Verfahren zum Warten eines Leistungserzeugungssystems, das eine Antriebsmaschine (10) und einen Generator (12) mit einer Generatorwelle umfasst, wobei drehende Komponenten des Generators und der Antriebsmaschine mit einer Kupplung verbunden sind, wobei die Kupplung Folgendes umfasst:

eine mit der Generatorwelle verbundene Nabe (50);
einen Kupplungsflansch (56), der mit einer drehenden Komponente der Antriebsmaschine (10) verbunden ist; und
eine Elastomerkomponente (52, 54), die sich zwischen der Nabe (50) und dem Kupplungsflansch (56) befindet, und die eine flexible Drehmomentübertragung zwischen der Antriebsmaschine (10) und dem Generator (12) bereitstellt, **gekennzeichnet durch**:

Abtrennen des Kupplungsflanschs (56) von der Antriebsmaschine;
Bewegen des Kupplungsflanschs axial entlang der Generatorwelle in Richtung auf den Generator (12), um den Kupplungsflansch (56) von der Elastomerkomponente (52, 54) zu lösen; und
Entfernen der Elastomerkomponente (52, 54) radial von der Kupplung, wenn der Kupplungsflansch (56) axial entlang der Welle in Richtung auf den Generator bewegt worden ist.

Revendications

1. Système de production d'énergie comprenant :

un moteur d'entraînement (10),
un générateur (12) avec un arbre de générateur ; et
un accouplement qui relie des composants rotatifs du générateur (12) et du moteur d'entraînement (10),
dans lequel l'accouplement comprend :

un moyeu (50) relié à l'arbre de générateur ;
une bride d'accouplement (56) reliée à un composant rotatif du moteur d'entraînement (10) ; et
un composant élastomère (52, 54) situé entre le moyeu (50) et la bride d'accouplement (56) afin de fournir une transmission de couple flexible entre le moteur d'entraînement (10) et le générateur (12),

caractérisé en ce que :

la bride d'accouplement (56) est agencée pour être déconnectée du moteur d'entraînement et pour se déplacer axialement le long de l'arbre de générateur vers le générateur (12) afin de désengager la bride d'accouplement (56) du composant élastomère (52, 54) ; et
le composant élastomère (52, 54) est agencé pour être retiré radialement de l'accouplement lorsque la bride d'accouplement (56) a été déplacée axialement le long de l'arbre vers le générateur.

2. Système de production d'énergie selon la revendication 1, dans lequel le composant élastomère (52, 54) est situé à l'intérieur de la bride d'accouplement (56) pendant le fonctionnement du système de pro-

duction d'énergie.

3. Système de production d'énergie selon la revendication 1 ou 2, comprenant en outre un ensemble de verrouillage (58) pour le maintien de l'accouplement ensemble pendant le fonctionnement du système de production d'énergie.

4. Système de production d'énergie selon la revendication 3, dans lequel l'ensemble de verrouillage (58), lorsqu'il est déconnecté, est mobile dans une direction axiale pour révéler le moyeu (50).

5. Système de production d'énergie selon l'une quelconque des revendications précédentes, dans lequel le composant élastomère (52, 54) est relié de manière amovible au moyeu (50).

6. Système de production d'énergie selon l'une quelconque des revendications précédentes, dans lequel le composant élastomère (52, 54) est en forme de disque.

7. Système de production d'énergie selon l'une quelconque des revendications précédentes, dans lequel le composant élastomère (52, 54) peut être retiré radialement de l'accouplement lorsque la bride d'accouplement (56) a été déplacée axialement le long de l'arbre sans qu'il soit nécessaire de retirer le générateur du moteur d'entraînement.

8. Système de production d'énergie selon l'une quelconque des revendications précédentes, dans lequel la bride d'accouplement (56) comprend des créneaux (68) qui viennent en prise avec des créneaux (66) sur le composant élastomère (52, 54).

9. Système de production d'énergie selon l'une quelconque des revendications précédentes, comprenant deux composants élastomères (52, 54) qui sont tous deux situés entre le moyeu (50) et la bride d'accouplement (56).

10. Système de production d'énergie selon la revendication 9, dans lequel le retrait de l'un des composants élastomères (52) permet à l'autre composant élastomère (54) d'être glissé axialement le long du moyeu (50) puis retiré dans une direction radiale.

11. Système de production d'énergie selon l'une quelconque des revendications précédentes, comprenant en outre un adaptateur (18) pour la connexion de parties non rotatives du générateur et du moteur d'entraînement, dans lequel l'adaptateur est agencé pour entourer l'accouplement, et l'adaptateur comprend deux parties séparables (30, 32).

12. Système de production d'énergie selon la revendication 11, dans lequel une partie de l'adaptateur (18) est amovible pour laisser une ouverture tandis que l'autre partie de l'adaptateur reste en place, et le composant élastomère (52, 54) est amovible à travers l'ouverture.

13. Système de production d'énergie selon l'une quelconque des revendications précédentes, comprenant en outre un cadre de plate-forme (14), dans lequel le moteur d'entraînement et le générateur sont tous deux montés sur le cadre de plate-forme.

14. Système de production d'énergie selon l'une quelconque des revendications précédentes, dans lequel le composant élastomère (52, 54) est amovible dans une direction radiale sans déplacer le générateur.

15. Procédé d'entretien d'un système de production d'énergie comprenant un moteur d'entraînement (10) et un générateur (12) avec un arbre de générateur, dans lequel les composants rotatifs du générateur et du moteur d'entraînement sont reliés par un accouplement, l'accouplement comprenant :

un moyeu (50) relié à l'arbre de générateur ;
une bride d'accouplement (56) reliée à un composant rotatif du moteur d'entraînement (10) ; et
un composant élastomère (52, 54) situé entre le moyeu (50) et la bride d'accouplement (56) et qui fournit une transmission de couple flexible entre le moteur d'entraînement (10) et le générateur (12),
caractérisé par :

la déconnexion de la bride d'accouplement (56) du moteur d'entraînement ;
le déplacement axial de la bride d'accouplement (56) le long de l'arbre de générateur vers le générateur (12) afin de désengager la bride d'accouplement (56) du composant élastomère (52, 54) ; et
le retrait radial du composant élastomère (52, 54) de l'accouplement lorsque la bride d'accouplement (56) a été déplacée axialement le long de l'arbre vers le générateur.

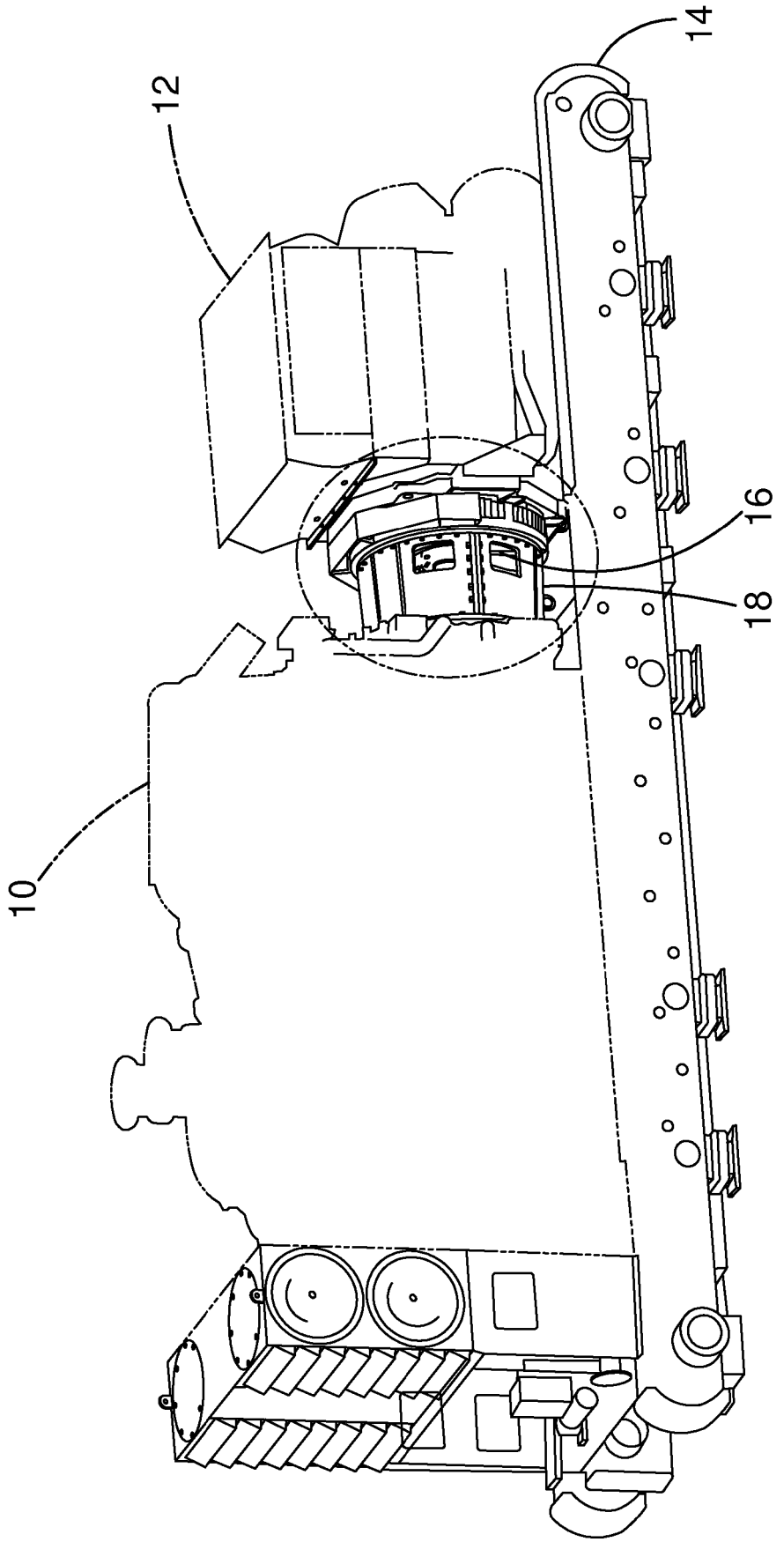

FIG.1

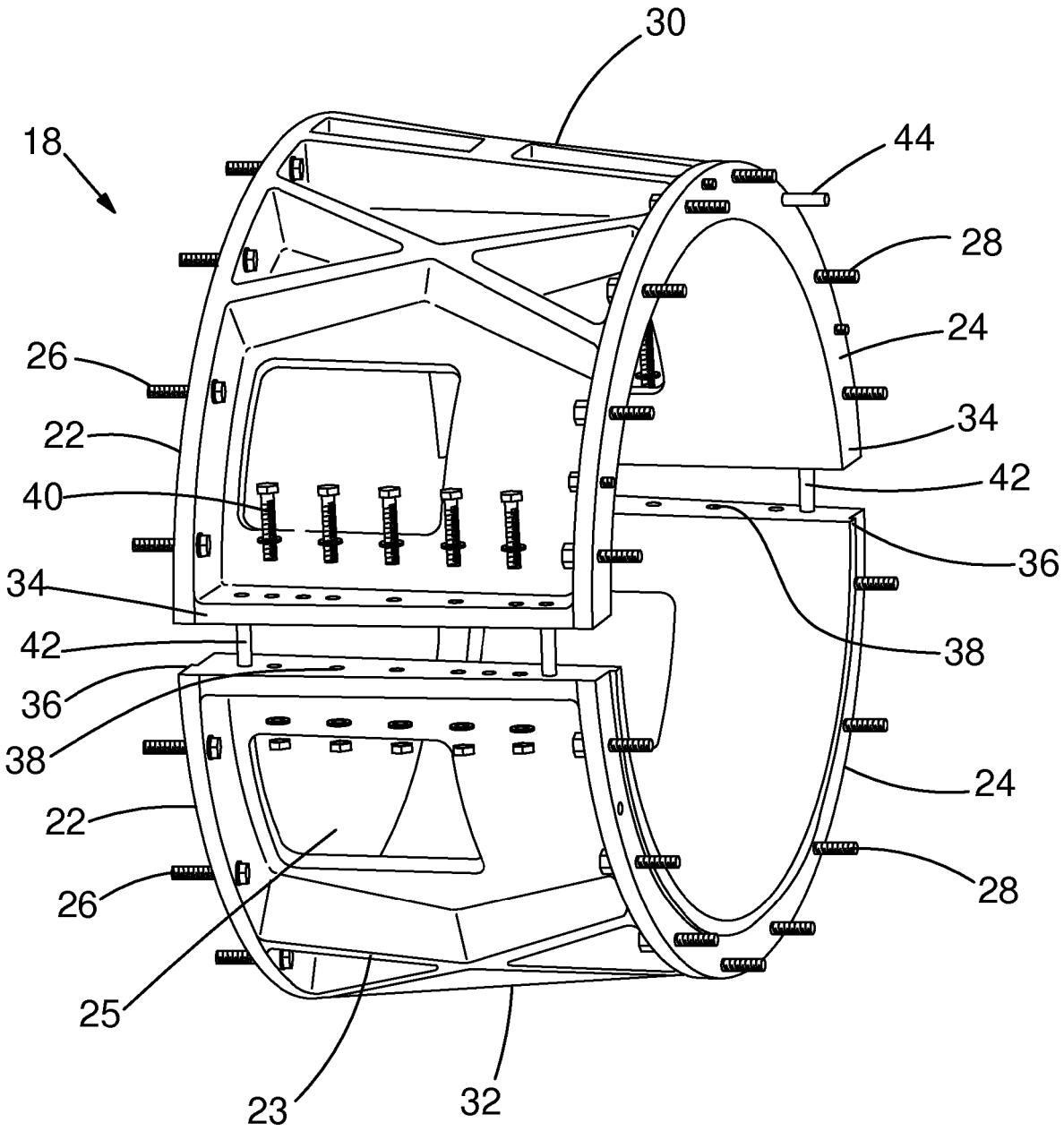

FIG.2

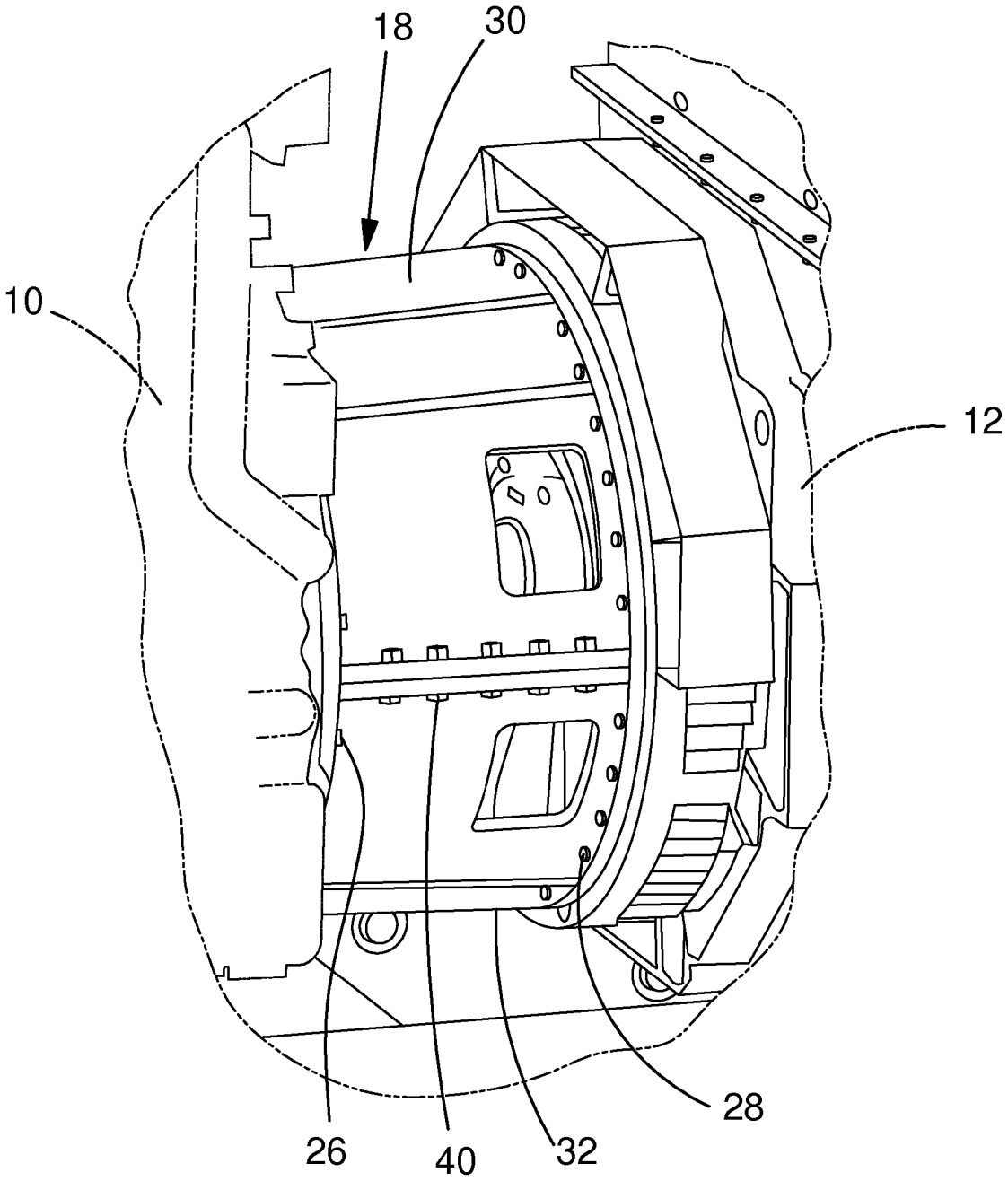

FIG.3

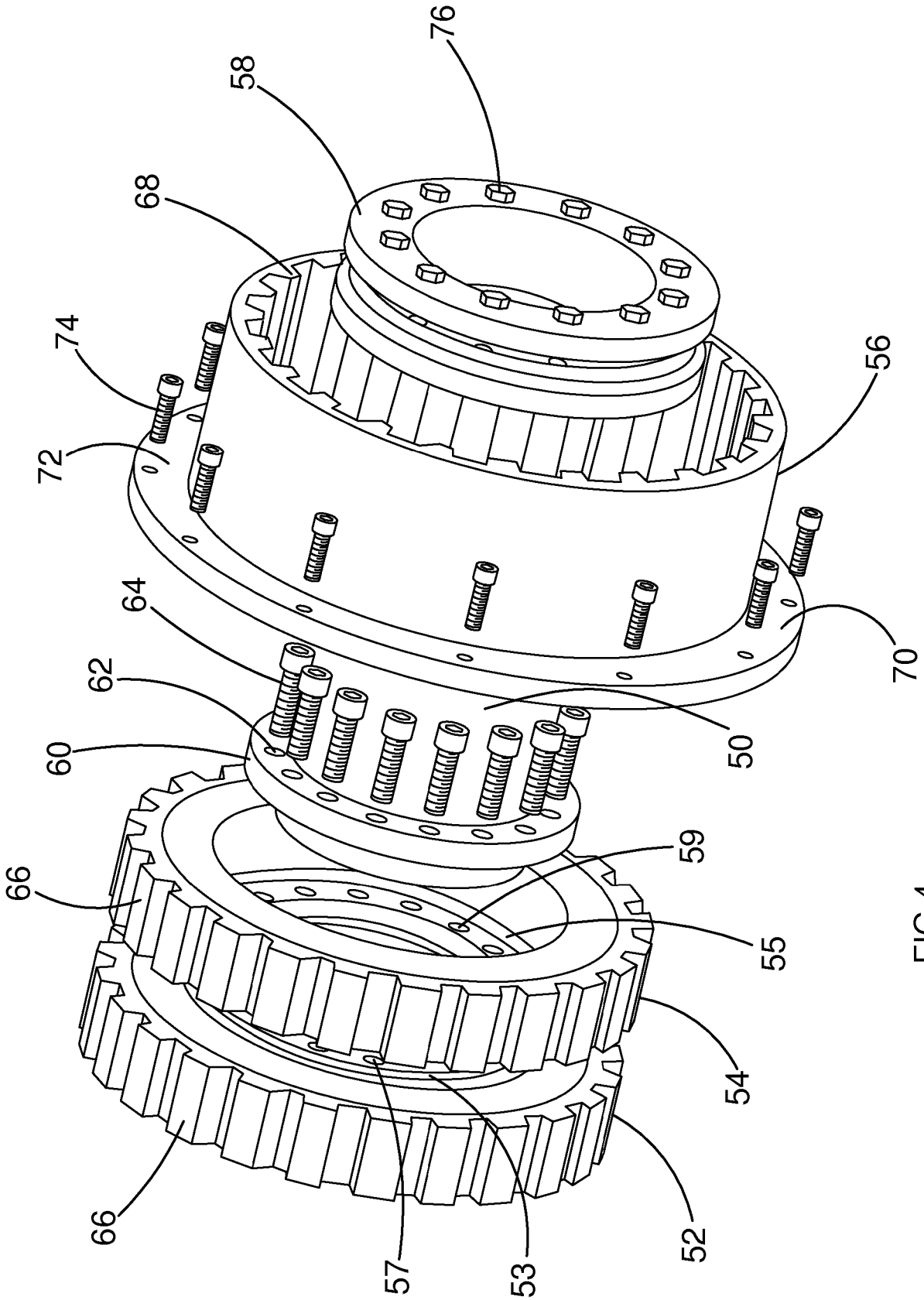

FIG.4

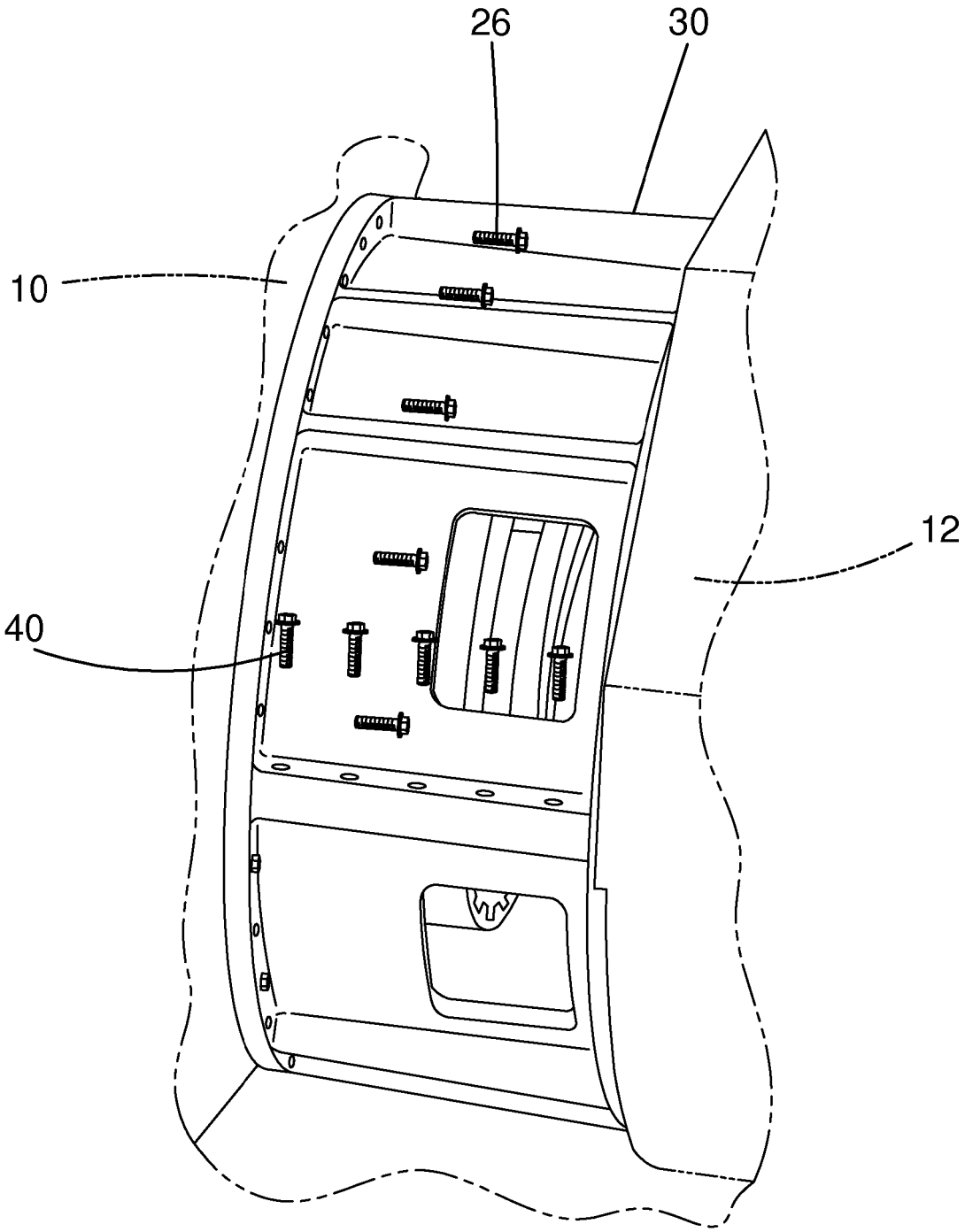

FIG.5

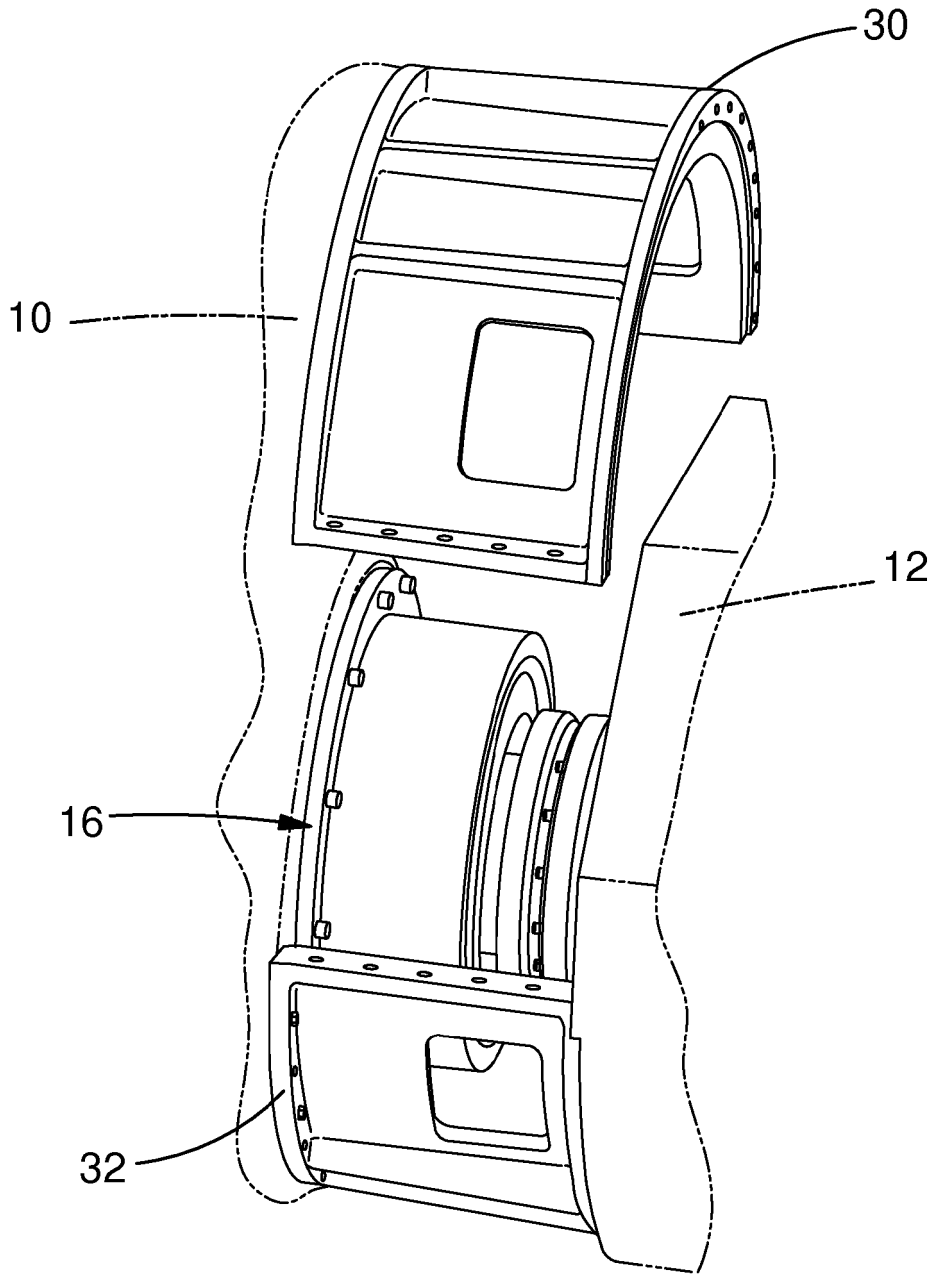

FIG.6

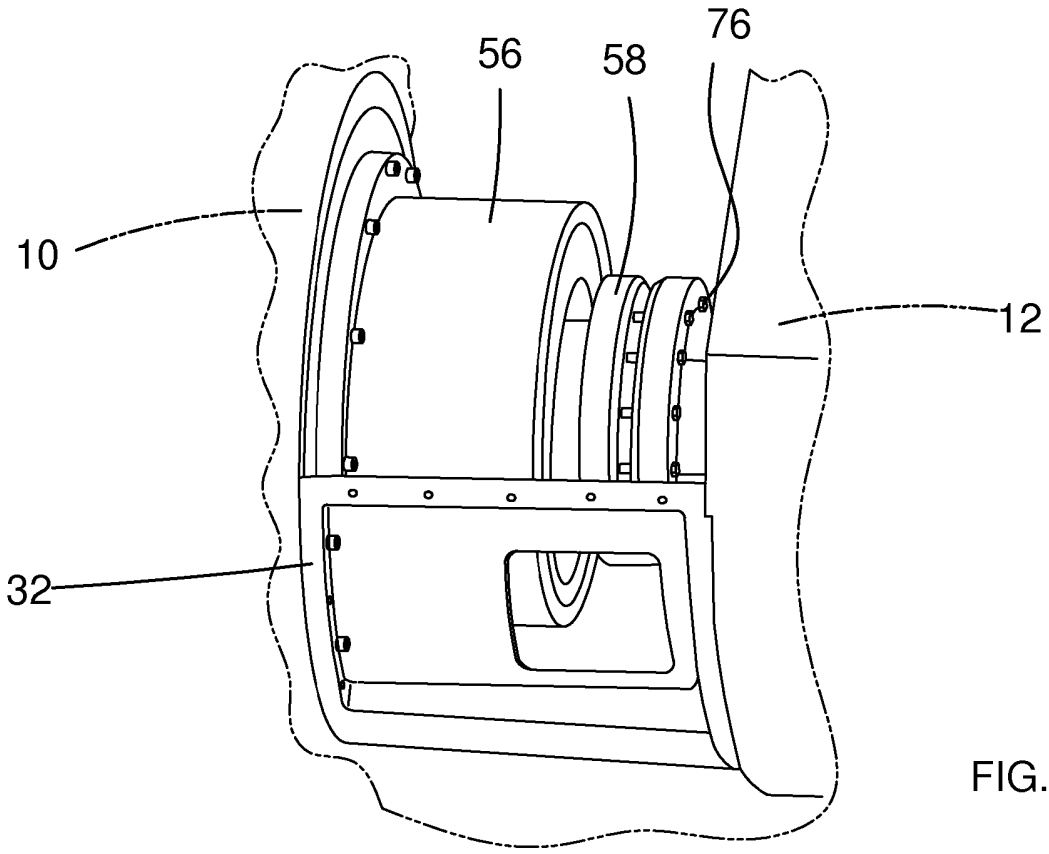

FIG.7

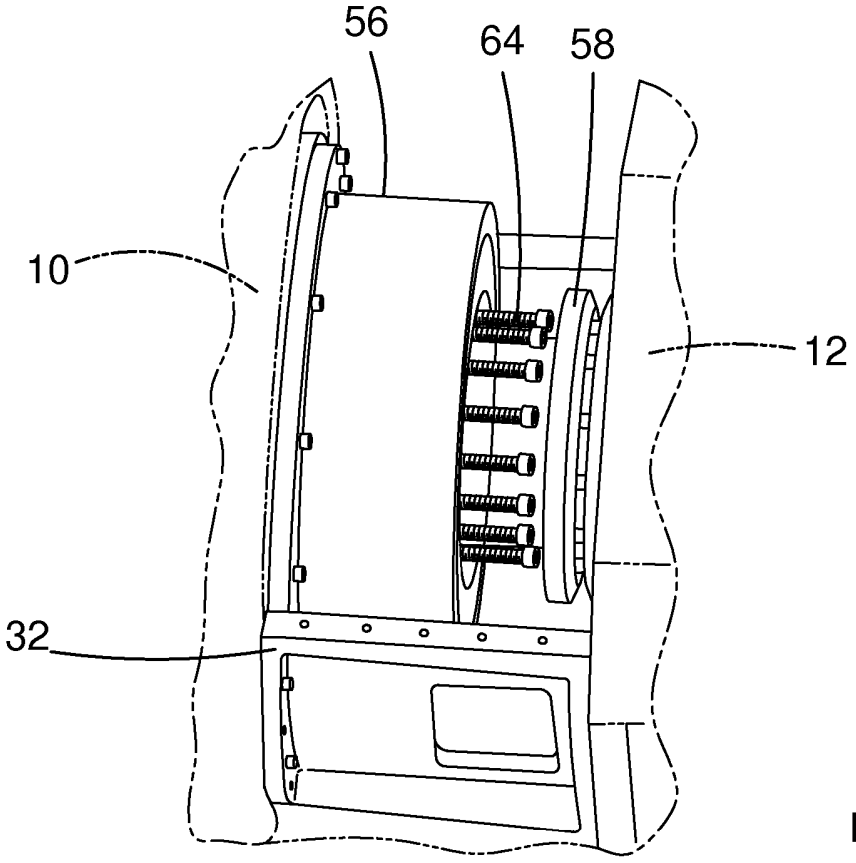

FIG.8

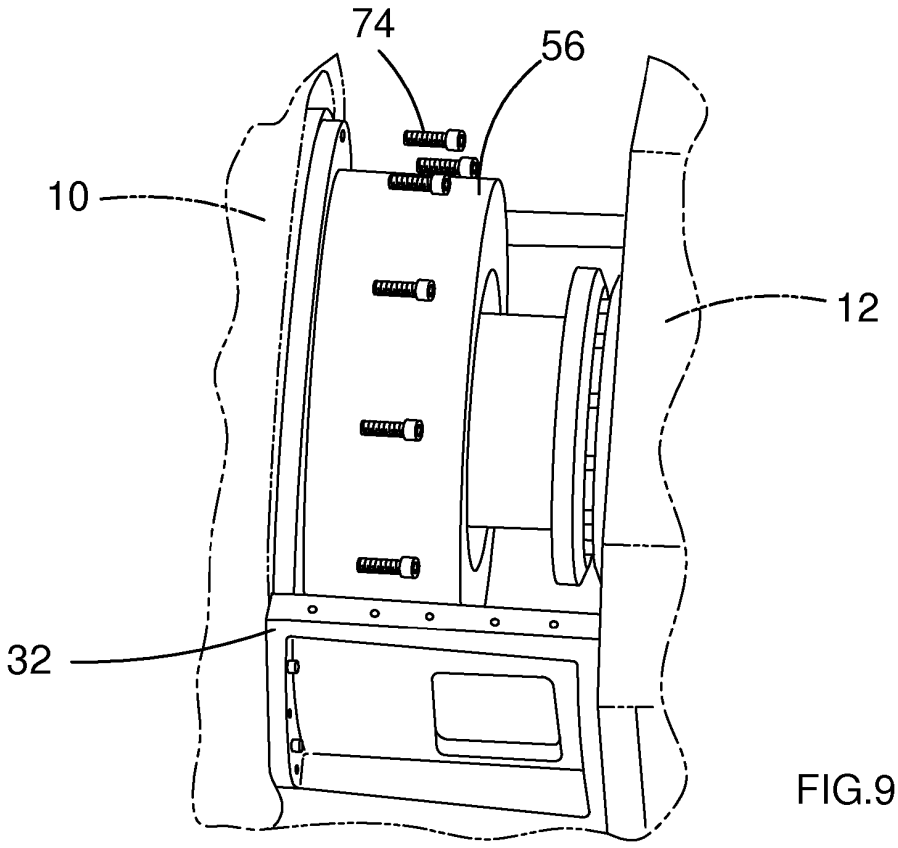

FIG.9

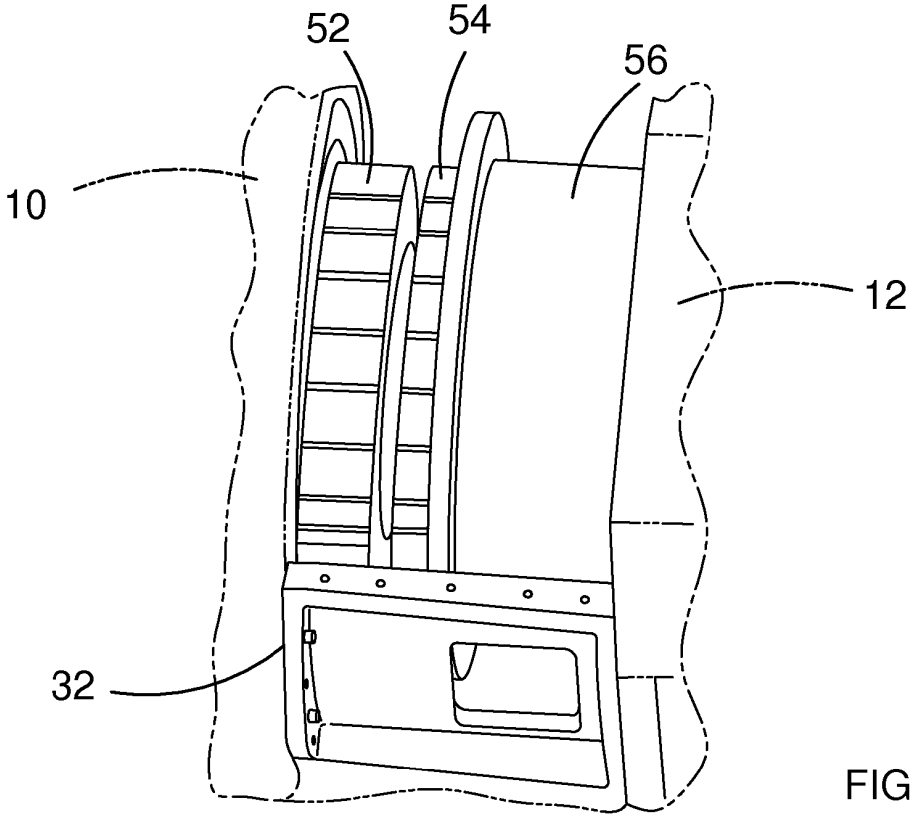

FIG.10

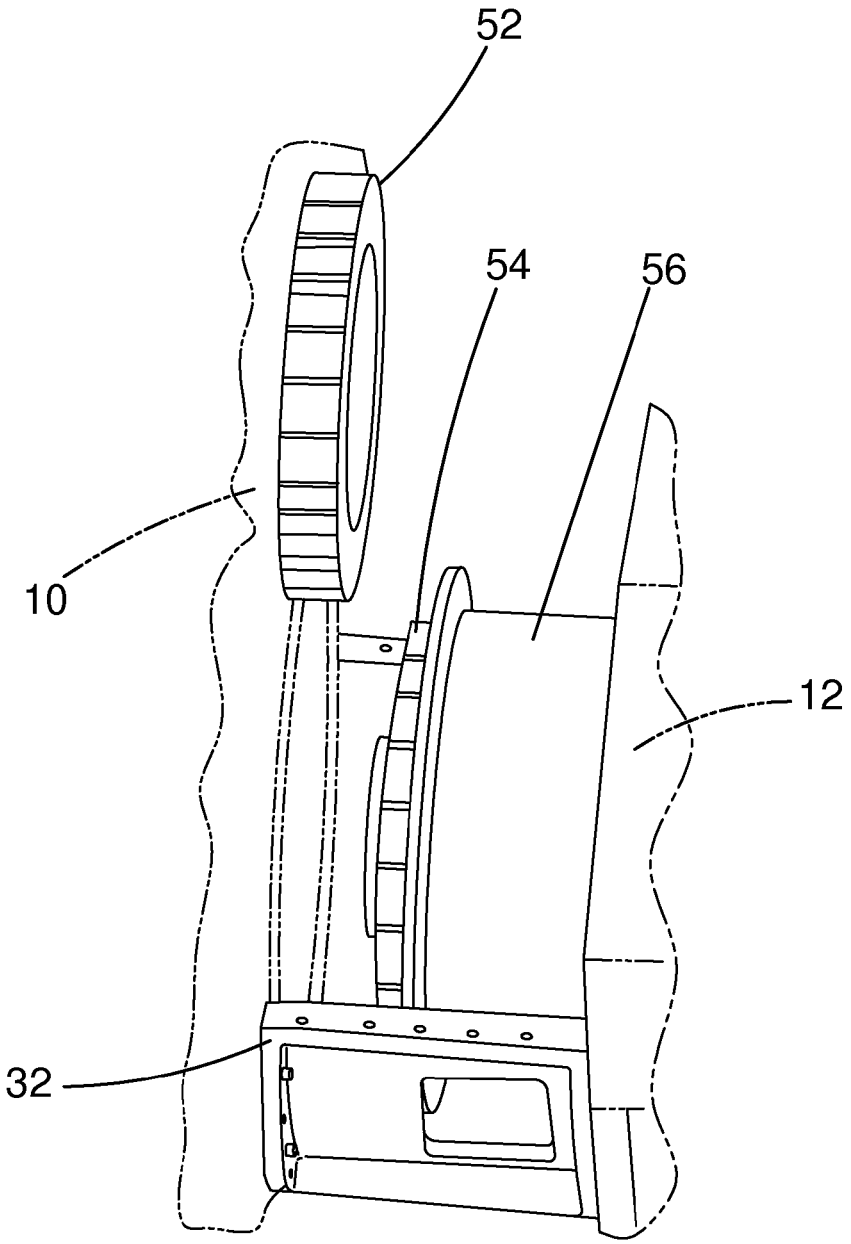

FIG.11

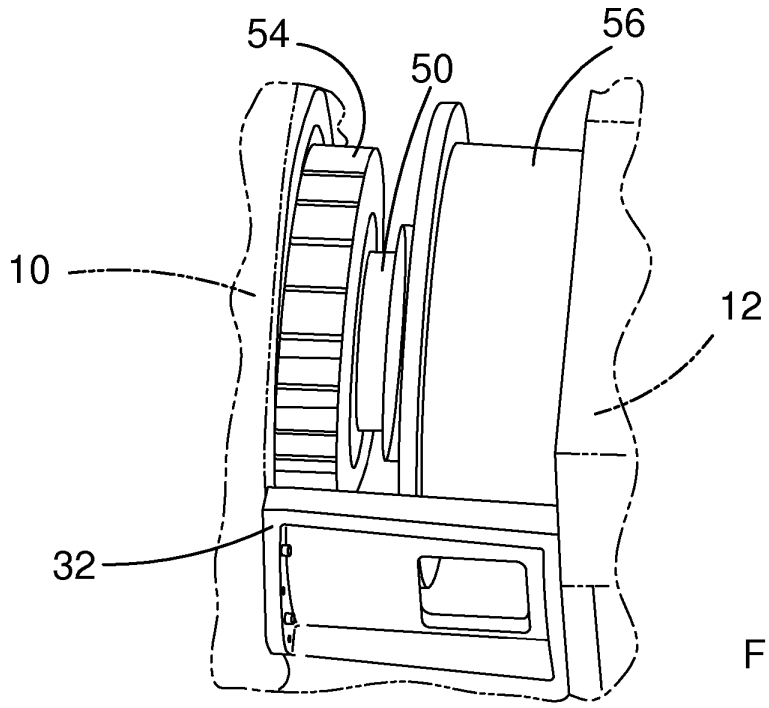

FIG.12

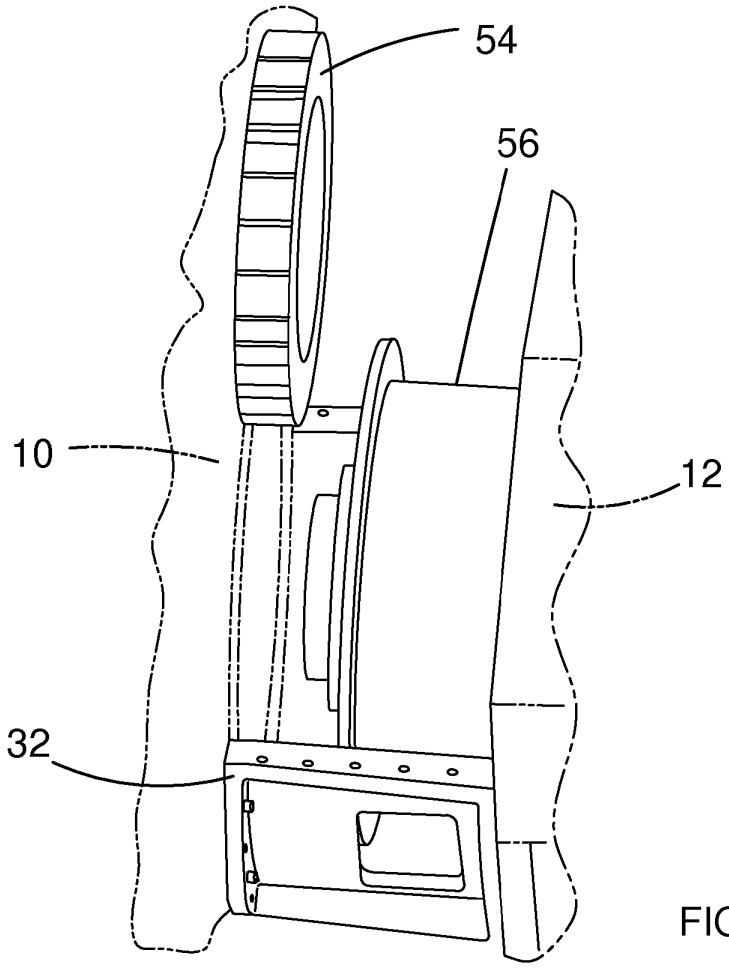

FIG.13

REFERENCES CITED IN THE DESCRIPTION

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